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CHANGING BALANCE SHEET RELATIONSHIPS  
IN THE U.S. MANUFACTURING SECTOR, 1926-77

John C. Ciccolo, Jr.

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The U.S. Manufacturing Sector, 1926 - 77

ABSTRACT

This paper documents trends in the sources and uses of funds, market valuations, and rates of return for a sample of U.S. manufacturing firms during the half-century ending in 1977. The major objective of the paper is to construct economic balance sheet relationships based on securities market valuations rather than on the more familiar book values used for accounting purposes.

Among the more interesting long-term trends highlighted in the analysis is the finding that the widely recognized increase in debt in manufacturing firms' capitalization has come primarily at the expense of preferred stock. A second interesting point is the contrast between the sharp fall in common equity values in 1929-32, which was entirely reversed by 1936, and the even sharper post-1968 decline which was not reversed by 1977 nor, for that matter, by 1981.

This paper is an introduction to a more comprehensive study which will be part of the second stage of the Debt/Equity Research Project.

Professor John H. Ciccolo, Jr.  
Department of Economics  
Boston College  
Chestnut Hill, Mass. 02167

(617) 969-0100 X3688

Several aspects of the recent performance of U.S. non-financial corporations have attracted widespread attention. Since the mid-1960s there has been a dramatic decline in the securities markets' valuation of these firms relative to the replacement costs of their assets, and also relative to the returns generated by these assets.<sup>1</sup> At the same time, nonfinancial corporate businesses have become more reliant on debt securities in financing their growth.<sup>2</sup> The inflationary environment of the past fifteen years has provided a powerful incentive for those with taxable incomes to increase their indebtedness. Additionally, as Friedman [3] points out, the postwar trend away from internal sources of funds toward debt financing represents, at least partially, an adjustment toward more normal pre-depression debt levels.

To place these issues in perspective, this paper documents trends in the sources and uses of funds, market valuations, and rates of return for a small sample of manufacturing corporations over the 1926 - 77 period. The emphasis of the study is on the detailed market valuations of the firms' securities. There are several advantages to this sampling approach. First, a consistent set of aggregate balance sheet and income accounts is unavailable for the prewar period. Also, by working at the individual firm level, one can obtain accurate information on the market values of traded securities and more detailed information on the structure of firms' balance sheets than is

typically available at the aggregate level. While the purpose of this paper is only to describe the aggregate characteristics of this sample, future research will use the underlying micro data set to test specific hypotheses regarding firm financing and investment decisions, and the financial markets' valuation of these activities.

The sample of firms used in this study is actually composed of nine separate subsamples of firms drawn periodically from various editions of Moody's Industrial Manual. The composition of this sample is outlined in Table 1. The goal was to obtain subsamples of size 50 but, given our criteria regarding reporting and accounting procedures, this was not always possible. This procedure of using subsamples of firms has the advantage of admitting to the sample firms that were created or destroyed during the 1926-77 period but presents some problems in maintaining continuity.

While fifty items relating to the income account, balance sheet and market valuations of the firms are included in the database, a substantial amount of aggregation is performed to present the general characteristics of the sample. Accordingly, the balance sheets of the sample firms are consolidated as described in Table 2. For each firm, variables of interest - - such as new debt or equity issues, for instance - - are

measured relative to net assets. Then firm data are averaged for each year to provide a time series for a hypothetical firm with the mean characteristics of its subsample. Table 3 shows the results of performing such calculations on the components of net assets for the overlapping years of the subsamples as well as for the years 1926-27 and the years 1976-77.

An interesting feature of the results presented in Table 3 is the rather dramatic decline in the Cash Items variable which is composed mainly of cash and short-term marketable securities. Considered in conjunction with the recent increase in the role of debt in corporate capital structure, the decline is even more striking. Closer inspection indicates that, at least since the mid-1960s the fall in the share of Cash Items in net assets has been accompanied by an increase in the share of physical capital. The drastic jump in Current Liabilities in 1941 is due primarily to increased corporate taxation.

#### Sources and Uses of Funds.

Figure 1 illustrates the relative importance of external and internal funds in financing our 'average' firm, while Figure 2 depicts the role of debt among external sources of finance. In both figures, the large spikes appearing above the years 1937, 1941, 1947, 1951, 1956, and 1974 coincide with periods of unusual inventory accumulation and apparently represent a demand for external funds to finance unplanned inventories. However, this is not true of the broad spike that appears

above the years 1965-68. During this period there was an unusually large demand for funds for capital expenditures and for takeovers.<sup>3</sup>

To highlight the longer run trends, data on sources and uses of funds have been averaged over the individual years of the subsamples and the results are presented in Table 4. According to these results, net issues of debt securities remained quite constant from the 1936-41 period to the mid-1960s when a large shift toward external sources of funds occurred. In fact, the percentage of total sources accounted for by net debt issues since 1965 is about twenty, slightly more than double the pre-1965 percentage. The results of Table 4 also clearly illustrate the increased demand for funds to finance nonfinancial activities that occurred since the mid-1960s. Virtually all of the jump in total uses is accounted for by increased expenditures on physical assets. The gradual trend toward external, relative to internal, sources of funds during the earlier postwar years reflects primarily a decline in undistributed profits relative to net assets.

Several features of the 1927-30 and 1931-35 periods require comment. First, during 1927-30 there were virtually no retirements of common stock and the -0.8 figure under stock retirements is solely due to retirements of preferred stock. Net issues of common equity were negligible except for the years 1928 and 1929. Furthermore, the Plant/Equip-

ment numbers for years prior to 1935 were estimated as depreciation allowances plus the change in net property account and are thus not comparable to the figures presented for later years. This latter feature of the data accounts for the relatively large discrepancy between total uses and sources for 1927-30. Also, the relatively low number for undistributed profits for the 1927-30 period, 2.8 percent of net assets, is not indicative of low profitability as seventy percent of funds available for common were paid out as dividends.

#### Market Valuations.

Securities markets provide a continuing valuation of corporations and their earnings streams and, therefore, indirectly of their net assets. This section of the paper investigates how these market valuations have behaved, relative to net assets, over the 1926-77 period.

Figure 3 plots the ratio of the market value of securities to net assets for each of the nine overlapping subsamples. In addition the diagram also indicates the composition of the total ratio. For instance, the distance between the horizontal axis and the first broken line represents the market valuation of debt securities relative to net assets. To assist in interpreting the figure, Table 5 provides the average values for the overlapping years of the subsamples, as well as for 1926-27 and 1976-77.<sup>4</sup>

Both Table 5 and Figure 3 clearly indicate the increasing

importance of debt in the capital structure of our 'average' corporation. What is somewhat surprising is that the sum of debt and preferred stock, relative to net assets, has remained virtually constant over the entire fifty year period, suggesting that the increase in debt has come primarily at the expense of preferred stock.

Another feature of Figure 3 which clearly stands out is the sharp fall and subsequent rapid recovery of the common equity component of the ratio during the 1930-34 period. This is even more dramatic when one considers that capital goods prices were falling and, thus, reducing net assets and moving the ratio in the opposite direction.

Figure 3 also plainly shows the substantial decline in equity values that began in 1968. This slide in the ratio of the market value of equity relative to net assets is steeper and more prolonged than any previous decline illustrated in the diagram.

#### Rates of Return.

This section of the paper presents calculations of several measures of the returns experienced by firms in the sample. Figure 4 compares the rate of return on common stockholders' equity with the total rate of return on net assets. In computing both rates, an adjustment is made to put depreciation charges on a replacement basis. Stockholders' equity is defined



here as net assets minus the market values of debt and preferred stock.<sup>5</sup> An inventory valuation adjustment (IVA) is not included in the numbers in Figure 4 as, to date, the database only contains sufficient information to compute the IVA for the years since 1960. However, an IVA is included in Table 6 which compares various rates of return computed for the 1961-70 and 1971-77 periods. Coupled with the information presented in Figure 3 and Table 5, these results confirm the significant decline which has recently occurred in the securities' markets valuation of assets relative to the returns generated by these assets. Considering the differences in samples, the rates of return on net assets, inclusive of the IVA, are surprisingly close to those reported by Brainard, Shoven and Weiss [1, Table 1, p. 463]. Their estimates for the rate of return on net assets are 7.8 and 6.9 percent for the 1961-70 and 1971-77 periods, respectively, compared to the estimates of 8.7 and 7.5 percent presented in Table 6.

The rates of return reported in Table 6 ignore the effects of inflation and expected inflation on the real value of the firms' financial assets and liabilities. In particular, the component of the rate of return on net assets which reflects the tax deductibility of the inflation premium contained in nominal interest rates is not included in the calculations.

Also, no allowance is made for the distributional effects of inflation and anticipated inflation between creditors and stockholders.

Conclusion.

This paper has presented some of the aggregate characteristics of a sample of manufacturing firms for the years 1926-27. The results, as regards the postwar period, are broadly consistent with those obtained by other researchers. That is, the data show the increasing importance of external, particularly debt, sources of funds in financing firms' real investment expenditures. The results also illustrate the dramatic decline that has occurred during the past fifteen years in the securities markets' valuation of net assets relative to replacement values, and also relative to rates of return.

Further research will concentrate on using individual firm data to attempt to better understand the relationships between firm asset and liability structure, and the relationships between firm financing and real investment decisions. A clearer resolution of many of the outstanding issues regarding aggregate relationships between inflation, tax policy, financing and investment decisions, and market valuations requires an improved understanding of individual firm behavior.

Footnotes

1. See, for instance, Brainard, Shoven and Weiss [1] and Feldstein [2].
2. Friedman [3], especially pp. 21-26.
3. Takeovers show up on the balance sheet in miscellaneous items as this variable contains the difference between the actual cost of an acquisition and its book value. Generally, acquisitions exceeding ten percent of the purchasing firm's net assets disqualified the firm from the sample.
4. Debt due in less than one year is valued at book. Nontraded long-term debt is valued using a bond price index generated for each year for each subsample.
5. Analogous calculations using book values have little effect on the results.

References

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2. Feldstein, Martin. 1980. Inflation and the stock market.  
American Economic Review 70: 839-47.
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TABLE 1  
Sample Description

<u>Subsample Number:</u>	<u>Years of Coverage</u>	<u>Volume of Moody's (source)</u>	<u>Number of Firms in Subsample</u>	<u>Number of Years</u>
1	1926-30	1931	48	5
2	1930-35	1936	46	6
3	1935-41	1942	48	7
4	1941-47	1948	47	7
5	1947-53	1954	50	7
6	1953-59	1960	50	7
7	1959-65	1966	47	7
8	1965-71	1972	37	7
9	1971-77	1978	40	7

TABLE 2

Net Assets

Cash items  
+ Receivables  
+ Inventories (replacement)  
+ Net property (replacement)  
- Current liabilities (excluding short-term debt)  
+ Miscellaneous items (net)

Liabilities

Short-term debt  
+ Traded long-term debt  
+ Non-traded long-term debt  
+ Preferred stock  
+ Common stockholders' equity

TABLE 3

<u>Years</u>	<u>Cash Items</u>	<u>Composition of Net Assets, Selected Years</u> (as a percentage of net assets)				<u>Current Liabilities</u>	<u>Miscellaneous</u>
		<u>Receivables</u>	<u>Inventories</u>	<u>Net Property</u>			
1926-27	15.3	14.4	25.4	47.7	-7.4	4.8	
1930	18.0	11.2	22.2	48.2	-6.1	6.6	
1935	22.1	11.4	22.3	42.7	-7.3	8.3	
1941	22.8	14.6	31.3	43.2	-20.5	7.7	
1947	22.0	16.4	32.5	45.2	-21.3	5.9	
1953	24.7	16.1	33.6	47.5	-26.2	4.4	
1959	17.1	17.5	29.5	48.6	-19.5	5.6	
1965	13.4	20.1	30.8	47.0	-21.9	6.6	
1971	10.1	20.6	29.6	49.5	-19.2	6.9	
1976-77	10.2	19.4	26.3	53.0	-20.9	6.4	

Note: Rows may not sum to 100 per cent because of rounding.

TABLE 4

## SOURCES AND USES OF FUNDS AS A PERCENTAGE OF NET ASSETS

## SOURCES

Year	Total Sources	Debt Issues	Debt Retirements	Stock <sup>a</sup> Issues	Stock Retirements	Undistributed Profits	CCA
1927-30	7.3	2.4	-2.3	2.1	-0.8	2.8	3.1
1931-35	2.6	0.9	-1.5	0.9	-0.9	-0.1	3.3
1936-41	7.5	2.4	-1.4	1.6	-0.6	2.2	3.3
1942-47	10.3	2.8	-1.5	2.0	-0.7	4.1	3.6
1948-53	11.0	2.9	-1.2	0.7	-0.7	5.4	3.5
1954-59	10.6	2.4	-1.4	1.5	-0.5	4.4	4.2
1960-65	10.6	2.6	-1.5	1.6	-0.4	3.6	4.7
1966-71	13.9	4.5	-1.5	2.1	-0.3	4.6	4.6
1972-77	12.5	4.8	-2.4	1.5	-0.6	4.9	4.3

## USES

Year	Total Uses	Plant/Equipment	Cash Items	Inventories	Receivables, Misc. (net)	Current Liabilities
1927-30	6.4	5.2	1.0	-0.2	-0.6	0.3
1931-35	2.5	2.5	0.3	0.1	-0.1	-0.3
1936-41	7.2	4.7	1.0	2.9	1.6	-3.1
1942-47	10.6	7.8	2.6	3.2	0.9	-2.1
1948-53	10.9	7.4	2.1	2.7	1.3	-2.5
1954-59	10.4	7.1	0.6	1.8	1.6	-0.9
1960-65	10.4	7.6	0.7	1.8	1.7	-1.8
1966-71	13.7	8.7	0.7	3.2	2.1	-2.0
1972-77	12.7	8.6	1.4	3.1	2.4	-3.0

<sup>a</sup> both preferred and common shares.



TABLE 5

Market Value of Securities  
Relative to Net Assets

<u>Years</u>	<u>Debt</u>	<u>Preferred</u>	<u>Common</u>	<u>Total</u>	<u>Debt Relative to Preferred + Common</u>
1926-27	.123	.147	1.175	1.44	.093
1930	.091	.154	1.345	1.59	.061
1935	.068	.194	1.350	1.61	.044
1941	.076	.170	0.853	1.10	.074
1947	.099	.110	1.001	1.21	.089
1953	.132	.057	0.798	0.99	.154
1959	.140	.026	1.494	1.66	.092
1965	.156	.015	1.775	1.95	.087
1971	.202	.026	1.307	1.53	.152
1976-77	.205	.013	0.675	0.89	.298

Table 6

Rates of Return  
(percent)

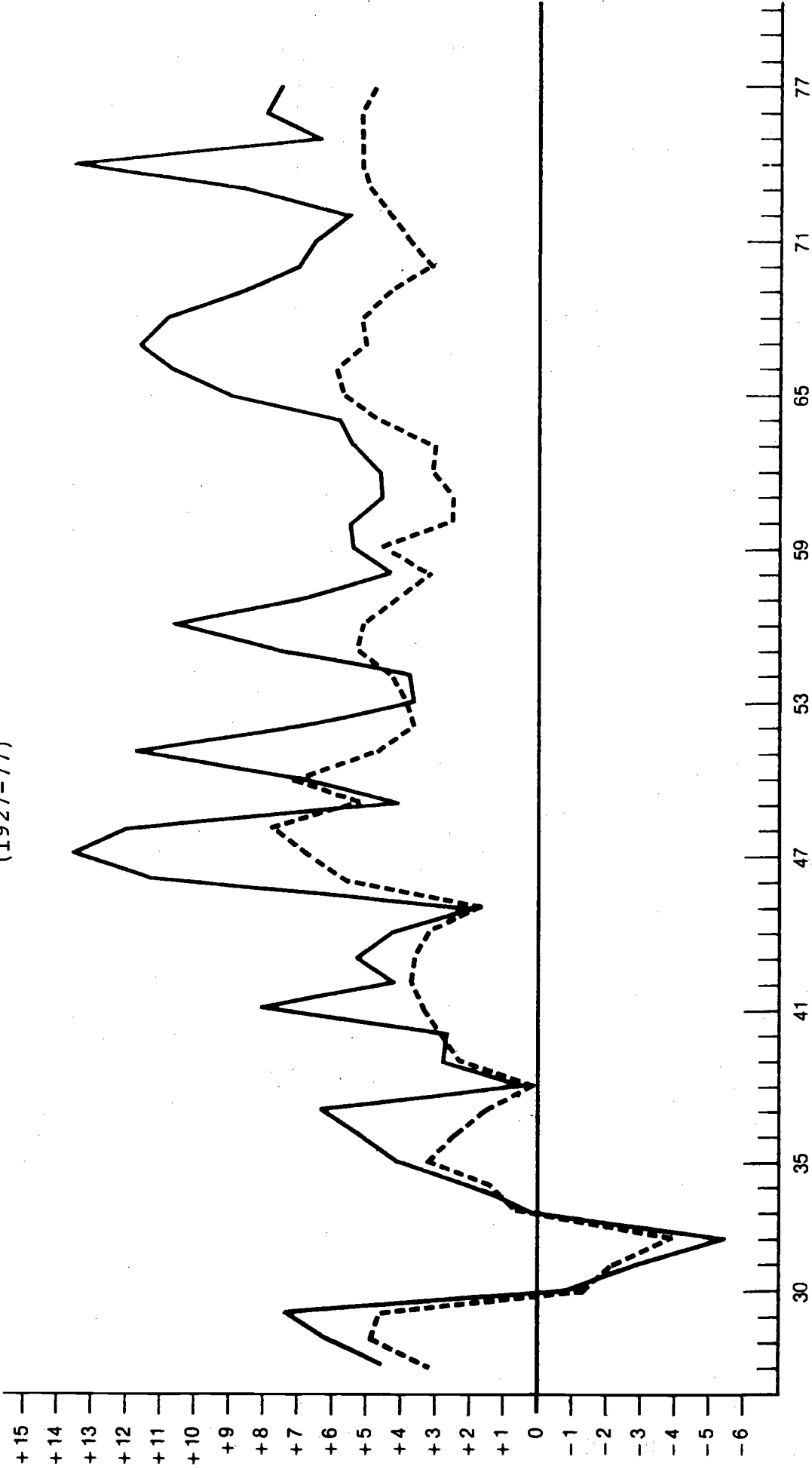
	<u>Rates of return on stockholders' equity</u>		<u>Rates of return on net assets</u>	
	<u>with IVA</u>	<u>without IVA</u>	<u>with IVA</u>	<u>without IVA</u>
1961-70	9.3	9.7	8.7	9.1
1971-77	6.3	8.6	7.5	9.0

FIGURE 1

# Sources of Funds as a Percentage of Net Assets

(1927-77)

Percent



----- = Additions to retained earnings  
———— = Additions to retained earnings plus net new issues of securities

FIGURE 2

# Sources of External Funds as a Percentage of Net Assets (1927-1977)

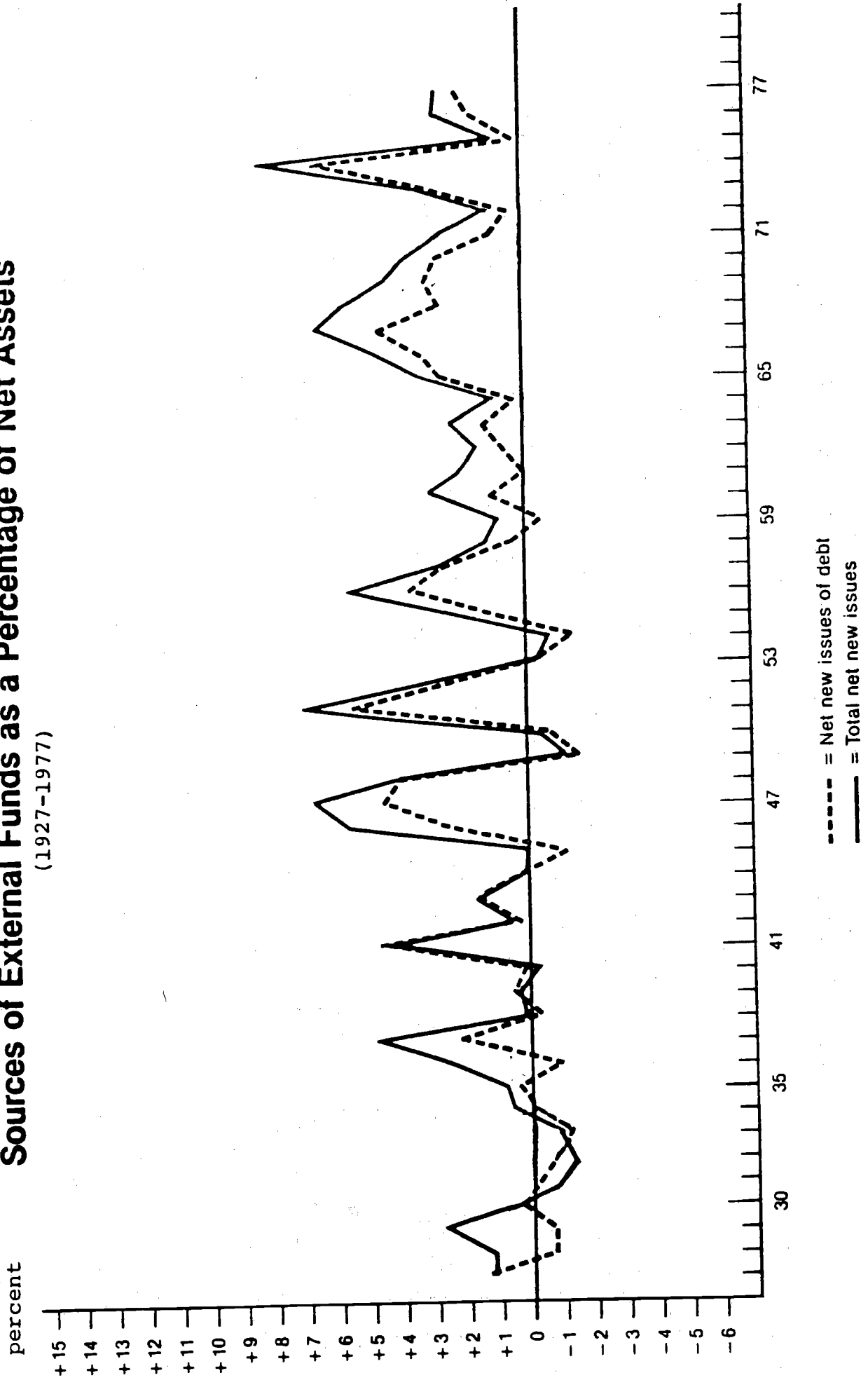


FIGURE 3

MARKET VALUE OF SECURITIES,  
RELATIVE TO NET ASSETS  
(1926-1977)

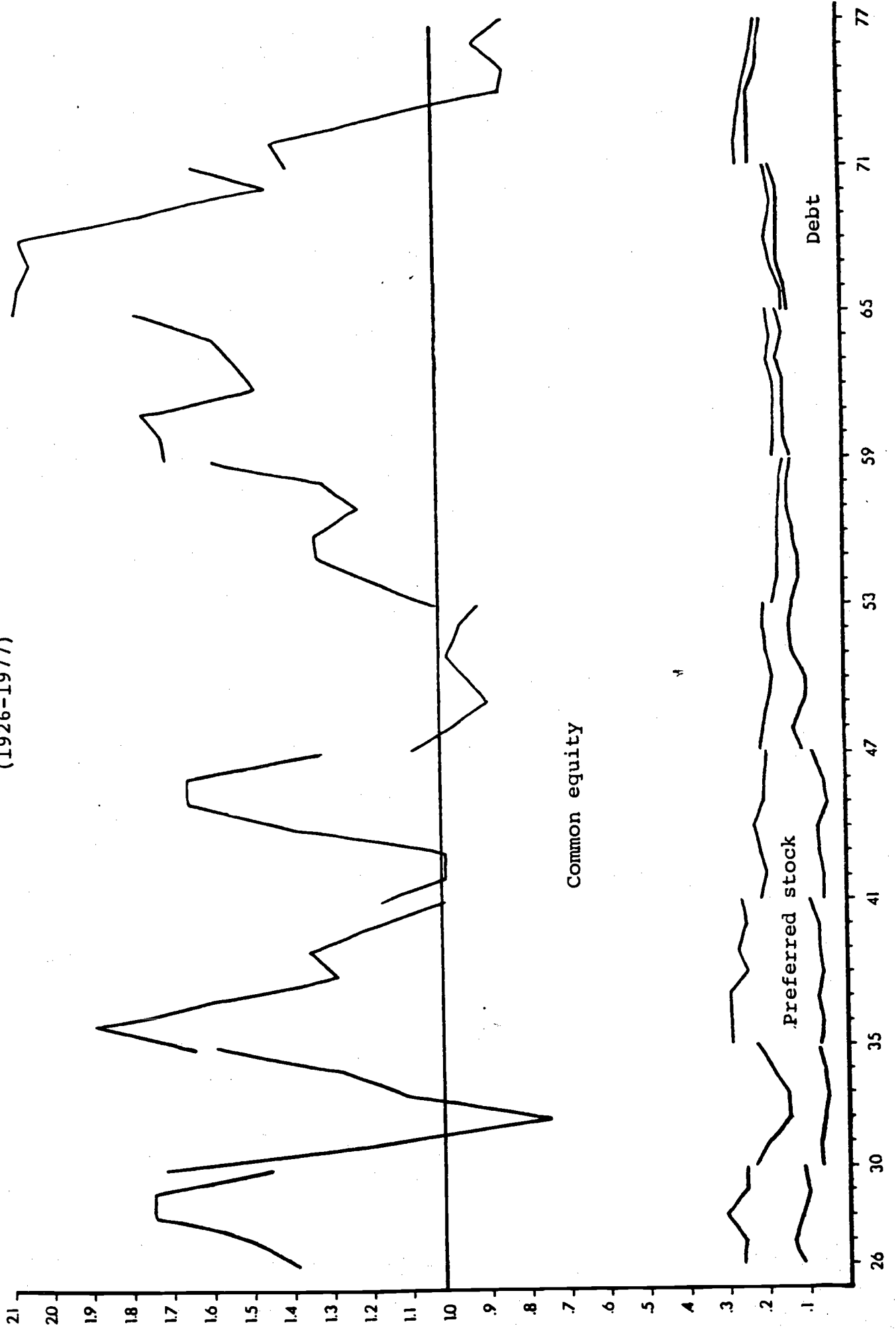


FIGURE 4

# Net Rates of Return (1927-1977)

